New Voting Technologies and Elections in Federal and Regional States in Practice

Serdült, Uwe ; McArdle, Michele ; Milic, Thomas ; Wheatley, Jonathan

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NEW VOTING TECHNOLOGIES AND ELECTIONS IN FEDERAL AND REGIONAL STATES IN PRACTICE

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Abstract:

Experimentation with new voting technologies (NVT) typically starts with a pilot scheme on a lower level of government where not much harm can be done in case of failure. In this overview article across some of the most well-known federations, we are looking at practice and the legal bases for such pilots. The way NVTs are regulated is far from being harmonised and can be founded on an explicit legal basis or just as well on the lack thereof. The phase of the electoral cycle for which NVT are most common relates to electronic means of counting votes, whereas remote voting with the use of the Internet is still very much an exotic undertaking. A more recent dynamic can be observed for e-collecting schemes attached to e-petition systems. More centralised legislation does not seem necessary at this stage and will appear once a threshold of practice has been reached.

Keywords: *electronic voting, Internet voting, e-counting, e-collection, e-petition*

Résumé :

Expérimenter les nouvelles technologies de vote (NTV) commence habituellement par un chemin pilote à un niveau inférieur d'organisation de l'Etat, pour qu'en cas d'échec soient minimes les conséquences négatives. Dans cet article nous allons passer en revue la pratique et les bases légales pour de tels programmes pilotes dans certains Etats fédéraux les plus connus. La manière de régir les NTV est loin d'être harmonisée et peut s'appuyer sur une base juridique explicite, ou, tout aussi bien, sur l'absence de celle-ci. La phase du cycle électoral pour laquelle les NTV sont les plus communes concerne les moyens électroniques de dépouillement du vote, tandis que le vote à distance, par le biais de l'Internet, est toujours une pratique exotique. Une dynamique plus récente peut être observée pour les systèmes de collecte électronique attachés aux systèmes des pétitions électroniques. Une législation centralisée ne paraît pas être nécessaire dans cette étape, mais apparaîtra une fois atteint un seuil de l'expérience derivée de la pratique.

Mots-clés : *vote électronique, vote par Internet, dépouillement électronique, collecte électronique, pétition électronique*

Abstract:

Experimentarea noilor tehnologii de votare (NTV) începe în mod tipic cu o schemă-pilot la un nivel de organizare inferior, la care să nu se înregistreze consecinţe negative în caz de eşec. În acest articol, vom trece în revistă practica şi bazele legale pentru astfel de programe-pilot din unele dintre statele federale cele mai bine cunoscute. Modul în care sunt reglementate NTV este departe de a fi armonizat şi se poate baza pe un temei juridic explicit sau, la fel de bine, pe lipsa acestuia. Faza ciclului electoral pentru care NTV sunt cele mai comune se referă la mijloacele electronice de numărare a voturilor, în timp ce votul de la distanţă, prin utilizarea internetului, este încă o practică exotică. O dinamică mai recentă poate fi observată pentru sistemele de colectare electronică ataşate sistemelor de petiţii electronice. O legislaţie centralizată nu pare a fi necesară în această etapă, dar va apărea odată ce a fost atins un prag al experienţei venite din practică.

Cuvinte-cheie: *vot electronic, vot prin internet, numărare electronică, colectare electronică, petiţie electronică*

1. Introduction

The following text assembles information on how new voting technologies are regulated and applied in a sample of *federated states* and states that stop short of federalism, but still include one or more *devolved territories*. Many such states allow their sub-national units some degree of autonomy when it comes to the organisation and management of elections or referendum votes. Regarding the definition of new voting technologies (NVT) we apply a pragmatic nominal approach as they are listed in a more concise way elsewhere.[1] In particular, we focus on the regulation and use of electronic voting machines, Internet voting systems, and electronic counting machines such as optical scanners, but also precision scales. The aim was not to come up with an exhaustive census of all sub-national institutional regulations and designs, but to introduce the reader to some of the most prominent examples we are aware of.

Given that the use of NVTs is still in its infancy, in most of the cases identified below legislation regulating their use is undeveloped at national level and often non-existent at sub-state level, even where sub-state entities have some power to make their own laws on how elections within their remit are to be carried out. Typically, NVTs have been introduced on an *ad hoc* basis in selected cities and municipalities, taking advantage

[1] http://www.osce.org/odihr/elections/104939, accessed 7 March 2016.

of a permissive legal environment. Given the security fears associated with NVTs, court rulings have far more often had the effect of ending experimentation with NVTs, rather than enabling their implementation.

Bearing this in mind, a narrow focus on legislative acts would be insufficient in providing an informative overview of the state-of-the-art with respect to NVTs in decentralised states. Much of the focus of this paper is therefore on experimentation at the lowest level of governance (i.e., at the level of cities and municipalities) and on the role of national and sub-state legislation in either enabling or impeding such experimentation. We also provide information on the types of NVTs that have been used in each case and the roles they play in electoral procedures at different levels.

The paragraphs below show that the development of NVTs is not unidirectional. If a degree of optimism on the potential of these technologies prevailed around the turn of the century, in recent years this has given way to a wary vigilance, and many of the experiments carried out in the early years have either been put on hold or abandoned completely. The erratic pace with which NVTs have been deployed reflects the fact that their use has been mainly the result of experimentation and has yet to be anchored by a firm legal grounding.

2. Case Studies

Australia

The Australian Electoral Act establishes no explicit provisions allowing or prohibiting electronic voting and counting technology. Due to Australia's strong federalism, all states and territories possess legislatorial power in these regards. In the case of Internet voting, New South Wales can be considered the most advanced, having introduced the i-Vote system for the 2011 state elections, allowing voters with disabilities or living far away from the next polling station to use Internet voting during an early vote period (Smith, 2016). The Parliamentary Electorates and Elections Act, in Section 120AC, states that *"The Electoral Commissioner may approve procedures to facilitate voting by eligible electors at an election by means of technology assisted voting"*[2]. Other than in New South Wales, the experience with electronic voting in Australia is rather ephemeral (Smith, 2016).

In addition to e-voting, the legislations in Victoria[3], the Northern Territory[4] and the Australian Capital Territory (ACT)[5] make reference to electronic technologies, being utilized in counting of ballot papers. These provide a legal basis for the implantation of e-counting technologies. Yet, from these solely the ACT has implemented e-counting. E-voting and e-counting technology was first commissioned in 2000. In 2001, following the elections, the Australian Electoral Commission (AEC) issued a favourable evaluation of e-counting technology, stating that it would be especially useful due to Australia's complicated alternative vote electoral system (AEC, 2010). However, they did retain some sobriety due to the costs of acquisition and maintenance of the required scanners (AEC, 2010). Later that year, the ACT first implemented e-counting for both electronic votes and traditional paper ballots. Yet, the preferences indicated by the voters had to be entered manually. After having reused the same system in 2004, the ACT's electoral commission (ACTEC) switched to a new intelligent character recognition scanning system, which obviated the need for manual coding for the 2008 elections. This system has proven a success (ACTEC, 2015). Furthermore, Southern Australia uses e-counting for local government, industrial and parliamentary elections.

Austria

The Austrian Internet voting experience was short lived. In 2009, the only legally binding election with Internet voting took place in the Federation of Students which

[2] http://www.legislation.nsw.gov.au/#/view/act/1912/41/part5/div12a/sec120ac, accessed 13 May 2016.

[3] In the case of Victoria, it is Part 6A of the Electoral Act from 2002.

[4] In the case of the Northern Territory, it is Division 6A of the Electoral Act from 2004.

[5] In the case of the ACT, it is Division 9.3 of the Electoral Act from 1992.

was surrounded by a lot of political conflict and disagreement about the usefulness of the technology (Krimmer *et al.*, 2010). Following the debate, including the Constitutional Court declaring a decree regulating the Internet voting not to be in line with underlying legislation, the Minister of Science and Research decided not to proceed with Internet voting for university elections (Goby and Weichsel, 2012).

Sub-national elections are governed by state law. As these must abide by the Constitution, there are currently no trials or projects advancing Internet voting at this level. Furthermore, there are no electronic counting machines used in Austria. Counting is undertaken in small voting districts with no more than about 700 voters per election authority. This setup allows for votes to be cast and counted exclusively in analogue form (BM.I – Wahlrecht, 2016).

Belgium

Belgium was one of the first countries to introduce electronic voting machines. It began in 1991 on an experimental basis in two electoral districts, namely in Verlaine and Waarschoot. In 1994, a federal law, the Law Organising Automated Voting, was introduced to regulate the procedure.[6] The law allows electoral districts and municipalities to use automated voting systems during elections. It is very specific about the procedures to be used.[7] By 1999, over 3.2 million voters (44% of the total electorate) cast their votes electronically.

Laws passed in 1999 and 2003 also allowed trials of an optical scanning system in which votes cast using the traditional pen and paper method were read electronically in the electoral districts of Chimay and Zonnebeke.[8] However, these trials were discontinued.

The Special Law of 13 July 2001 transferred to the regions competences in legislation on and regulation and organisation of municipal and provincial elections. The 2006 and 2007 local elections were the first to be organised by the regions on the basis of this law.

Following concerns about the capacity of the automated voting system to verify votes and about the overall security of e-voting, the law on automated voting was amended in 2003.[9] According to the revised law, votes cast electronically were also to be printed on paper.

In 2006 the Belgian government commissioned a comparative study from a consortium of universities on e-voting systems in nine European countries (including Belgium), in order to decide whether it is appropriate to continue the e-voting experiment.[10] The report recommended what is described as an *"improved paper based voting system"*, in which the voter casts his or her vote on

[6] The original law may be accessed, both in French and in Dutch, at this webpage: www.elections.fgov.be/fileadmin/user_upload/Elections2009/fr/lois/11avril1994_loi_vote_automatise__version_010207_.pdf, accessed on 7 March 2016.

[7] The law stipulates that electronic voting takes place at a polling station, in which there is a voting machine. Voters are provided with an electronic card that they insert into a slot in the voting machine. The display screen on the voting machine shows the serial number and the symbol of all the lists of candidates and the voter uses an optical pen to mark the list of his/her choice. The voter is then given the opportunity to confirm his/her vote before returning the card for inspection to the president of the polling station, and afterwards the card is inserted into an electronic ballot box, where it will remain after the data stored on it is read. Each polling station sends the data to the main office of the town or region, where it is recorded and aggregated.

[8] See also *Lecture optique pour les cantons de Chimay et Zonnebeke,* available at: http://www.elections.fgov.be/index.php?id=434&no_cache=1&print=1, accessed on 9 March 2016.

[9] Act of organizing an automated voting control system by printing the votes cast on paper and amending the Act of 11 April 1994 organizing automated voting, the Law of 18 December 1998 organizing automated vote counting through an optical reading system and amending the Act of 11 April 1994 organizing automated voting and the electoral code (11 March 2003), available at: www.ejustice.just.fgov.be/ cgi_loi/change_lg.pl?language=fr&la=F&cn= 2003031136&table_name=loi, accessed on 7 March 2016.

[10] Federal Public Service Interior (Intérieur Binnenlandse Zaken, IBZ), Direction des Elections. *BeVoting: Study of Electronic Voting Systems* (Version 1.1, 15 April 2007), available at: http://www.elections.fgov.be/fileadmin/user_upload/Elections2011/fr/presentation/bevoting-1_gb.pdf, accessed on 10 May 2016.

a voting machine and the computer then prints the vote on a ballot that contains both a human-readable part, and a bar code that can be read by a machine. In 2008, the Federal Parliament passed a resolution allowing continued experimentation with automated voting. As a result, the Federal Public Service Interior sought a partner to design a new voting system to recommend to the regions. In 2012 the firm *Smartmatic* was selected as the voting technology provider for a fifteen-year period in the Brussels-Capital region and in Flanders, but Wallonia opted out of the new system.

The *Smartmatic* system[11] was used in the 2012 municipal and provincial elections, the 2014 elections to the regional parliaments in Brussels-Capital region and in Flanders, in the 2014 federal elections and in the 2014 elections to the European Parliament. As previously, all electronic voting took place in polling booths and no Internet voting from private computers is permitted. Electronic voting only took place in Brussels-Capital region and in Flanders and, in these two regions, 153 out of 580 municipalities used the voting machines.

The government of Wallonia decided to end the experiment with electronic voting and return to traditional pen-and-paper based voting until a more reliable and secure system could be established in 2009. However, in 2011, the same government decided to allow those municipalities that already used electronic voting to continue the experiment in the 2012 elections, providing they met the extra costs incurred over and above the cost of the traditional system.[12] A number of communes did decide to continue with the experiment and used the old system of the optical pen.

[11] The *Smartmatic* technology works as follows: voters cast their votes on a voting machine that prints out a paper ballot with a bar code. The voter then scans the ballot using an electronic ballot box and deposits the paper copy in the box. This allows the vote to be counted both manually, and electronically.

[12] PourEVA. *Quand on choisit un mode de scrutin 13,7 fois plus onéreux, on en assume le coût* (26 January 2014), available at: www.poureva.be/spip.php?article787, accessed on 9 March 2016.

Canada

In Canada, the approach to the use of NVT such as Internet voting is much decentralised and mainly implemented on the local level in the provinces of Ontario and Nova Scotia (Goodman and Pammett, 2014). In 2006, for example, this new voting channel was available in 20 municipalities in the province of Ontario. Approximately 400,000 citizens were allowed to use it. For the 2010 elections, the figure of Ontario Internet voting towns and cities rose to 44 and to 97 out of 444 municipalities in 2014. The hitherto largest Internet voting trials in Canada took place in Halifax, Nova Scotia, with an electorate of approximately 310,000.[13] Interestingly, in 2012 Halifax had to face a request for a judicial recount of the election results because of a district seat that was won with only six votes difference. Thanks to the recount procedures laid out already in a 2008 by-law, there was no uncertainty about how to administer this task with Internet voting in place. Whereas the recount brought a mistake in one of the polling stations (result was submitted twice), no irregularities were detected for the votes cast via the Internet (Pammett and Goodman, 2013: 28).

Although there is no electronic counting present in Canada at the national level, a number of municipalities use e-counting machines in local elections. These are seen also as trials for provincial and national elections. A plentiful amount of reasons, such as the higher complexity and rise in number, has led to the increased use of such machines in local elections. Furthermore, the elimination or, at least, diminution of human error has also been a leading motive (Elections Canada, 2014). Canada's *Elections Act* does not mention electronic counting aids. Nevertheless, the wording is such as to not explicitly prohibit such aids, opening a possible adaption for future elections. In what's more, the national

[13] Further Internet voting experiences in Nova Scotia included (see Pammett and Goodman, 2013, for more details): Cape Breton Regional Municipality (83,000 electors, started 2012), Truro (10,000 electors, 2012) with the peculiarity that only electronic voting via the telephone or the Internet was available.

electoral commission is not responsible for the implementation of municipal elections. Hence, municipalities possess a certain degree of autonomy (Elections Canada, 2015).

Germany

In Germany, e-voting effectively came to a halt when the Federal Constitutional Court (*Bundesverfassungsgericht*) ruled it unconstitutional in 2009. Since then (almost)[14] no further moves have been made to enable an electronic voting process meeting those constitutional requirements. Before 2009, however, electronic voting was in use. The first trials on sub-national level were carried out in 1998 at local elections in Cologne. A year later, the city of Cologne used the electronic voting machines for its European Parliament elections. In 2002 the same voting machines came to use in the federal elections, however only on a small scale. The national elections of 2005 saw the first large-scale deployment of those voting machines. On that occasion, around two million voters in five different German states cast their vote electronically. Soon after, the deployed voting machines came under increasing criticism. In the Netherlands, a similar voting machine was cracked successfully by a group of hackers, which led the Dutch government to decertify the further use of that system in 2006. That incident prompted two German citizens to bring a lawsuit before the Constitutional Court in Karlsruhe, where they eventually succeeded.[15] So far, the last deployment of voting machines was on the occasion of the *Landtagswahlen* 2008 in Hesse.

It is, however, important to note that the federal electoral law of Germany (*Bundeswahlgesetz*) explicitly permits the use of voting machines (§ 35 *Stimmabgabe mit Wahlgeräten*). But *"the Federal Voting Machines Ordinance* ***(Bundeswahlgeräteverordnung)*** *is declared as unconstitutional because it does not ensure that only such voting machines are permitted and used which meet the constitutional requirements of the principle of the public nature of elections"* [16] – in the words of the citation from the Constitutional Court[17]. The use of electronic voting machines in future German elections thus depends on whether transparent control mechanisms for ensuring an accurate vote count can be provided or not.

Electoral counting in turn is currently allowed and deployed (since 2002) in some municipalities of the three *Bundesländer Hesse, Baden-Wurttemberg* and *Bavaria*. In contrast to the voting machines, these counting systems are not subject to any admission procedure. In *Hessen*, §48a(8) of the municipal election ruling permits the automated (electronic) counting of votes, although the respective municipality law (*Kommunalwahlgesetz*) does not provide a corresponding authorisation. In Bavaria it is §82 of the *Wahlordnung für die Gemeinde- und die Landkreiswahlen* that provides a legal basis for electronic counting, while in *Baden-Wurttemberg* it is §37 of the *Kommunalwahlordnung* that assures electronic counting. In practice, the electronic counting of votes works as follows: the ballots are combined with a bar code next to the candidates' names. The bar code is subsequently scanned with a respective bar code gun (or pen[18]). The votes are then transferred to a connected computer, on which the counting process is administered. On the occasion of the local elections in 2008 in Bavaria, roughly a thousand municipalities used the above-mentioned system to electronically count the votes.

[14] The Technical University of Darmstadt is developing a system ("Easy Vote") compatible with the requirements of the Basic Law.

[15] The 2005 elections result, however, was deemed valid by the court since there has not been any evidence of fraud or systemic errors.

[16] The latter principle is prescribed by the articles 38 and 20 of the Basic Law (*Grundgesetz*).

[17] Press release of the Federal Constitutional Court regarding the Judgment of 3 March 2009: https://www.bundesverfassungsgericht.de/SharedDocs/Pressemitteilungen/EN/2009/bvg09-019.html

[18] Following the 2005 national pilot study, the Senate of Hamburg decided to use a digital pen voting system for the upcoming local elections in 2008 (*Bürgerschaftswahl*). However, these plans have ultimately been cancelled due to concerns over the accuracy of voting tallies.

Increasingly, voting technologies should not only be understood in a narrow sense related to the act of voting or of counting the vote in an election or referendum. They could also be discussed in relation to e-petitions as well as crowd-sourcing legislation platforms, such as the ones in Finland and Latvia that integrate online endorsing mechanisms (Serdült *et al.*, 2016). In this sense, the example of the national, but also sub-national, e-petition websites in Germany are interesting. A petition right is defined in Article 17 of the German Basic Law (*Grundgesetz*) from 1949 and an e-collecting system was introduced in 2005, first as a pilot, allowing for the digital submission and endorsement of a petition. The German e-petition was modelled according to the Scottish system and can be considered to be one of the earliest and most advanced of its kind worldwide.

In Germany, a further distinction should be made between individual and public petitions, the latter can be submitted with the appropriate form on the Parliament's official website. With 50,000 signatures within four weeks, the petition can go public and eventually there will be a debate in the petition committee. Citizenship or residency is not required in order to submit or sign a petition. In case the petition is accepted as public, the petitioner is invited to participate in a session and speak in front of the committee.

The current system (see: http://epetitionen.bundestag.de) has been online since September 2012. Since May 2014 there is a secure e-ID option available for holders of the new German identity card. Instead of a petitioner entering personal data, one is temporarily transferred to the provider of the e-ID and would return to the e-petition site once authentication has taken place. The use of this option is, however, not mandatory. Interestingly, there seems to be a top-down diffusion effect of e-petition systems going on to the sub-national level: the City State of Bremen started with public e-petitions in January 2010 and Rheinland-Pfalz, Schleswig-Holstein and Thüringen followed soon thereafter. All other Länder, such as Baden-Wurttemberg or Bavaria, have a simple submission site with an Internet form only.

Switzerland

Switzerland is characterised by two distinctive political institutions that have affected experimentation with new voting technologies such as Internet voting. First, its extremely decentralised system of *federalism* and, second, a tradition of *direct democracy* in which citizens are called to vote very frequently, 3–4 times a year on federal, cantonal and communal issues (Serdült, 2014). The interaction of these two formal institutions played an important role in shaping the approach to experimentation with Internet voting. First, although there is an overarching umbrella legislation on the national level to guarantee political rights, the cantons are within certain boundaries in charge of legislating, implementing and administering elections as well as referendum votes (Driza Maurer, 2013: 16 – 21). They are free to choose whether or not to implement Internet voting.

The introduction of Internet voting in Switzerland is therefore characterised by a piecemeal implementation and diffusion process very typical for its federal political system (Mendez and Serdült, 2014). Although Internet voting is typically only available in a selection of municipalities, it has nevertheless been available for more than a decade on a more or less permanent basis. In addition, an increasing number of cantons is offering the new voting channel to their citizens living abroad (Germann and Serdült, 2014).

Judicial review by the highest Swiss court has so far rejected complaints against Internet voting[19] because it considered the legal basis provided by federal laws and in the cantons to be sufficient and because the plaintiffs were not able to point to technical flaws in the system able to change the final

[19] See for example the Federal Court Decision from 22 July 2014 (1C_136/2014) for a challenge of the vote result or the Federal Court Decision from 23 March 2006 (1P.29/2006) regarding access to the source code of the Internet voting software, available at: www.bger.ch

result of a vote (Driza Maurer, 2013; Hill, 2015).

Whereas the introduction of Internet voting is regulated in a national ordinance[20] and in great detail, several cantons and cities have experimented with e-counting without much control from the national level. The cantons Geneva (since 2001) and Basle-City (since 2015) as well as the cities Bern (2014), Lausanne and several others in the canton of Vaud (2005), Fribourg (2004) and St. Gallen (2008) are using electronic means for vote counting, such as optical scanners, based on cantonal and municipal legislation only. They must, however, get approval from the Swiss Government.[21]

For the counting with precision scales[22] and ballot counting machines[23], as they are used in banks to count paper money, the votes are first separated and sorted by hand and only thereafter they are counted by the machines. For optical scanners, the degree of technical complexity is higher because it is actually a software recognising the will of the voter. So far, the Federal Chancellery – as the national electoral management body – has only used very soft instruments in order to achieve a certain harmonisation of e-counting among the cantons in the form of a handout, in 2003, regarding the use of precision scales and eventually an additional one coming out in 2016. The imbalance regarding the (lack of) regulation for e-counting technology at national level in comparison to the detailed prescriptions for Internet voting is currently under review.

With three to four referendum dates a year, the Swiss electorate is called to vote on all three state levels more often than in any other polity. For many of these votes a prior collection of signatures is necessary. This is a tedious task which is sometimes outsourced to semi-professional signature collectors. Paying citizens for signing up for a certain cause is however forbidden by law.[24] It would therefore seem obvious to develop a system of e-collecting for the direct democratic instruments requiring a certain number of signatures. Such a system does not exist yet (Serdült *et al.*, 2016) and is not foreseen as a priority in the national e-government strategy paper of the Swiss government "Digital Switzerland"[25]. In the absence of an official e-collecting portal it is not surprising to see "wild", semi-automatic signature collecting portals appearing such as the one set up by middle-left political circles called www.wecollect.ch. This not-for-profit online platform supports initiative committees with an online solution allowing to fill in a pdf form which, however, still has to be signed and sent in by snail mail in the end of the process for verification.

United Kingdom

Electoral law in the United Kingdom is not enshrined in a single legal act; instead there is a large volume of both primary and secondary legislation regulating elections (separately) in England, Scotland, Wales and Northern Ireland. Overall, the law tends to lack detailed provisions on how elections

[20] All requirements and the whole legal basis are available on the website of the Federal Chancellery in German, French, Italian and also in English: https://www.bk.admin.ch/themen/pore/evoting/07979/index.html?lang=en, accessed on 3 March 2016.

[21] See Federal Act on Political Rights, Art. 84: Use of technical aids:
"1. The Federal Council may authorise cantonal governments to enact provisions that derogate from this Act for the purposes of ascertaining the results of elections and popular votes by using technical aids.
2. Election and popular vote procedures that use technical aids shall require the approval of the Federal Council." (See link above for the source.)

[22] See for example the municipality of Maur in the Canton of Zürich: http://ch.mt.com/ch/en/home/supportive_content/know_how/po/service/weighing_votes.html

[23] See for example in the ordinance related to the Law on Political Rights in the Canton of Argovia, in paragraph 30 (1): *"For vote counting in elections and referendums the use of technical or electronic aids is permitted, provided these procedures are reliable and approved by the State Chancellery"* [131.111 Verordnung zum Gesetz über die politischen Rechte (VGPR), 25 November 1992, in force since 1 January 1993 (https://gesetzessammlungen.ag.ch/frontend/versions/1622, accessed 6 June 2016)].

[24] On campaign regulation regarding financing and media, see Serdült, 2010.

[25] http://www.bakom.admin.ch/themen/infosociety/index.html?lang=en, accessed on 6 June 2016.

are to be conducted, and the way to conduct certain procedures is left to the discretion of the returning officer for the constituency. The use of specific technologies in the conduct of elections is not specified in the law. However, the 2000 Representation of the People Act allowed local authorities in England or Wales to submit proposals to the Secretary of State to carry out an electoral pilot scheme. Such pilot schemes can involve changes to how voting at local elections (district, county and borough council level) can take place and how votes cast are counted. The 2002 Scottish Local Government (Elections) Act granted permission for similar pilot schemes for local government elections in Scotland. Both acts allowed voting to take place in other places than the polling stations. The 2002 Scottish Local Government (Elections) Act allowed pilot schemes to alter the method used to cast votes. This was further reflected in the 2004 Local Governance (Scotland) Act, which made provision for the election of councillors by Single Transferable Vote (STV) in Scottish local elections.

The first trials to be held in the UK were carried out in the local elections of 2000. Electronic vote counting was used in the Broxbourne Borough Council and Three Rivers District Council (both in Hertfordshire). In the case of Broxbourne, a specific bar code was associated with each candidate on the ballot paper and a bar code reader was used to swipe the bar code next to the name of the candidate that the voter had selected. In Three Rivers, optical scanning machines were used to read the ballot papers.

Electronic counting was introduced for London mayoral elections and the simultaneous elections to the Assembly for London in 2000. It was considered expedient to do so as the voting and counting procedures were quite complex; each voter was asked to cast three ballots: one for mayor (ranked in order of preference), one to elect a constituency Assembly member and one to elect an additional member on a London-wide basis – the result of the Supplementary Vote system of proportional representation that was used to elect the London Assembly. Optical scanners to scan the ballot papers were provided by the company Data & Research Services (DRS), which won the contract to provide the technology for the electronic vote. Electronic counting was used again in the 2004, 2008, 2012 and 2016 Assembly and mayoral elections and the technology was once again provided by DRS.

2000 was also the year in which electronic voting was first used in the United Kingdom. Five pilots were carried out in Bury Metropolitan Borough Council, Salford City Council and Stratford-upon-Avon District Council, in which voters were able to cast votes using a touch screen voting machine installed at polling stations. The votes were also subsequently counted electronically.

Significantly, more pilot schemes were rolled out in local elections in 2002 and 2003. In 2002, fifteen local authorities used electronic counting mechanisms and eight of these used various electronic and remote voting procedures as well. Electronic counting either occurred automatically, as a result of electronic voting, when ballot papers were keyed into electronic scanners, or a semi-automated counting method was used whereby an electronic wand was passed over ballot papers[26]. In total, nine local authorities used some form of electronic or remote voting: five[27] used remote online voting (for example, from a personal computer), seven[28] used electronic voting via touch screen kiosks in the polling station or elsewhere, while two[29] allowed voting by SMS text messaging.[30] In 2003, seventeen pilots also introduced a number of forms of electronic voting, including Internet voting, voting via touch screen kiosks and voting by SMS text messaging, while three

[26] In Broxbourne and Liverpool.

[27] Two wards in Liverpool City Council, three wards in Sheffield City Council, two wards in St. Albans City and District Council, two wards in Crewe and Nantwich Borough Council and nineteen wards in Swindon Borough Council.

[28] Sheffield, St. Albans, Crewe and Nantwich, as well as the London Borough of Newham, Stratford-upon-Avon, Bolton Metropolitan Council and Chester City Council.

[29] Liverpool and Sheffield.

[30] See The Electoral Commission (2002). *Modernising Elections: A Strategic Evaluation of the 2002 Electoral Pilot Schemes*, available at: http://tinyurl.com/hhjxhtx, accessed on 2 March 2016.

councils introduced special schemes for electronic counting.

From 2004, the pace of innovation began to slow down and in 2006 just two local authorities trialled the electronic counting of ballot papers. The final round of pilots occurred in the 2007 local elections, five local authorities pioneered Internet voting schemes[31], while six used electronic counting of ballot papers[32]. In 2008 the Electoral Commission (EC) recommended that further pilots would be unnecessary and the introduction of Internet voting and counting more widely should only be introduced in combination with a more far-reaching plan for modernising elections, including a system of individual voter registration (introduced only in 2014), and procedures implemented to ensure that e-voting solutions were secure and transparent. The EC described the e-voting trials as *"broadly successful"* insofar as it made voting easier, but identified a number of problems involving accessibility, public understanding of the pre-registration process and (occasionally) technical issues. The EC rated electronic counting more negatively, pointing to significant technical problems that, on occasions, even made it necessary to abandon the electronic count and revert to traditional counting methods. Even though the government disagreed with the EC report and pledged to continue the schemes, no further such pilot schemes have been held by local authorities.

A rather original method of voting was used in September 2006 in the small Scottish town of Menstrie, Clackmannanshire, for local community council elections. Digital pens were used to record the votes on special digital paper. There is no evidence, however, that the trial was repeated.[33]

In *Scotland*, STV for local elections was introduced in 2007 according to the provisions of the 2004 Local Governance (Scotland) Act. Because the counting process for STV is complex and arduous, the Scottish government decided that the traditional manual counting of ballot papers should be replaced by an electronic vote count for both the local and Holyrood (Scottish parliamentary) elections, which were held simultaneously, on the 3rd of May 2007. The count took place in 32 counting stations across Scotland and electronic scanning machines were used. A number of problems were identified with the procedure, including a database malfunction within the electronic counting system in some of the count stations, and a disproportionate number of ballots were rejected. In subsequent elections Holyrood and local government elections were held separately and electronic counting was abandoned for the Holyrood elections. Electronic counting was used again for the Scottish local elections of 2012, although another company was contacted to implement the system (CGI replaced DRS as the main provider). The 2012 experience was widely hailed as successful and the same company will be used to implement electronic voting for the 2017 local elections.

United States of America

The USA is one of the countries with the oldest traditions and a frequent use of citizen initiated referendums. More than half of the US American states have some degree of direct democracy mechanisms in their constitutions, which in principle could make use of Internet voting[34] and e-collecting for their respective signature gathering procedures triggering a vote. Indeed, some US states, such as California and Oregon, have vibrant systems of direct democracy

[31] Rushmore Borough Council, Sheffield City Council, Shrewsbury and Atcham Borough Council, South Bucks District Council and Swindon Borough Council.

[32] Bedford Borough Council, Breckland District Council, Dover District Council, South Bucks District Council, Stratford-on-Avon District Council & Warwick District Council.

[33] BBC News, *Electronic Voting "World First"* (27 September 2006), available at: http://news.bbc.co.uk/2/hi/uk_news/scotland/tayside_and_central/5385086.stm, accessed on 2 March 2016.

[34] Since the history and legal quarrels in US states on electronic voting machines are well-known and documented, we are highlighting here the less commonly known regulations in the field of e-collecting. Regarding Internet voting, the general tone in the USA is very critical. Besides experiments for primary elections and military personnel overseas, there was not much practice in recent years (Simons and Jones, 2012).

involving citizen initiated referendums. Unlike Switzerland, there is, however, no tradition of direct democracy at the federal level. But, whereas Switzerland has not yet looked into making use of e-collecting, there is noticeable demand for upgrading the signature collecting via more efficient online means in several US states.[35]

All states wanting to use e-collecting systems connected to referendum votes have thus far been blocked by the courts. As is typical of the US, there has been a flurry of legal activity surrounding e-collecting as proponents and opponents have mobilised via the courts. Prominent cases include states such as Utah, California, Tennessee and Nebraska.

Following a Utah Supreme Court ruling on the validity of e-signatures, the Lieutenant Governor issued an interim rule allowing the collection of e-signatures. The interim rule remained in effect for 120 days from 8 July 2010; initiators were required to use an *"electronic packet"* created by the Governor's office and a signee could only sign in a petition circulator's presence. Following that period, state officials were scheduled to work with the Utah Legislature to establish a permanent rule in the state code. Opponents argued that the rule did not allow for the chief purpose of electronic signatures – to facilitate signature gathering by allowing it to be done online – and restricted petitioners. In early 2011 Senate Bill 165 – a measure banning e-collecting – was introduced. The Bill was approved in March by the Utah House of Representatives and enacted into law following approval by the Governor.[36]

In June 2011, the California First District Court of Appeals issued a ruling in *Ni v. Slocum* prohibiting electronic signature collection in California. Verafirma founder Michael Ni filed the suit, challenging San Mateo County's rejection of an electronic signature in favour of Proposition 19 (Regulate, Control and Tax Cannabis Act of 2010). In its decision, the court ruled that the term "affix", as used in California law, implies a physical signature.[37]

Legislative Bill 566 introduced by Nebraska State Senator Paul Schumacher would have allowed proponents to collect signatures online as long as they pay a fee to authorities for operating costs. The Bill died after being referred to government, but another version (Bill 214) was proposed by Mr Schumacher in 2015 to establish e-collecting for initiative and referendum petitions. In April, the Bill was still on hold in the Government, Military and Veteran Affairs Committee, but it has since been abandoned.[38]

In Nashville-Davidson County, Tennessee, a proposal was made for a petition campaign for marijuana decriminalisation with an intention to use e-collecting. County Election Commission said they would not allow electronic signatures. A lawsuit was filed against the Election Commission in January 2014 seeking to require the commission to accept electronic signatures.Ultimately the initiative did not progress to the ballot because the group behind the initiative did not submit any petitions by the deadline on 18 May 2015.

As we can see, legislation has been enacted in some states such as Utah explicitly prohibiting e-collecting, while the court in California clarified that a signature implies a physical signature, i.e., not electronic. In Tennessee, the Election Commission has prohibited e-collecting. These have all been states with instruments of direct democracy. Furthermore, at the state level we found no evidence of e-collecting being made available for petitions in the US, a weaker signature gathering instrument that does not trigger the potential for un-mediated policy change. There is one notable exception, however, at the Federal level. Launched by the Obama Administration in 2011, *"We the people"* is an e-petition system that provides a platform for citizens to petition the US administration's

[35] For an overview of the debate in the USA, see: https://ballotpedia.org/Electronic_petition_signature

[36] http://le.utah.gov/xcode/Title20A/Chapter1/20A-1-S306.html?v=C20A-1-S306_2014040320140513, accessed on 3 March 2016.

[37] http://www.leagle.com/decision/In%20CACO%20 20110630026/NI%20v.%20SLOCUM, accessed on 3 March 2016.

[38] https://ballotpedia.org/Nashville-Davidson_County_Metro_Marijuana_Decriminalization_Initiative_(August_2015), accessed on 3 March 2016.

policy experts (see https://petitions.whitehouse.gov). The availability of such an instrument, with a fully-fledged e-collecting system at the federal level, contrasts vividly with dynamics at the state level, where no e-collecting is possible for petitions. The big difference is the lower degree of consequentiality on the national level (Serdült *et al*., 2016).

3. Conclusions

This short overview across some of the most prominent federated polities confirmed that there is a vibrant, ongoing but at the same time very scattered experience with NVTs in all of our cases. Comparing the different NVTs we looked at (electronic or Internet voting, e-counting, e-collecting to some degree), we are not able to detect a clear emerging pattern. The way NVTs are regulated is far from being harmonised and can be founded on an explicit legal basis or just as well the lack thereof. Explanatory factors such as the degree of federalism, the legal system as well as political culture certainly play a role, but we also observe a very much erratic dynamic over time. Experimentation can come to a sudden halt by technical failures or the decision of a court or ministry.

NVTs seem to be rather sticky in the sense of a path dependency. Early adopters of electronic voting machines have either fully or partially abandoned their use (Belgium, Germany, UK) or continued, but not made any serious attempts to make a transition to the Internet age. Constituencies with current Internet voting trials are usually not early adopters and take a very piecemeal trial and error approach to introducing this new voting channel.

Within a country only a handful of municipalities or regions typically take the lead (Australia, Canada, Switzerland), be it because of a certain familiarity with remote voting such as in Switzerland, where postal voting is generalised and very popular, be it because of rather pragmatic concerns in constituencies, where the distance to the poll can be very long, such as in Australia and Canada, or be it because of political leaders wanting to be at the forefront of technical development seeking a positive image. Except for Austria, all our selected countries show a long-standing and rather expanding experimentation with the use of e-counting technologies. Whereas e-collecting systems do not seem to make any inroads into polities with strong, binding elements of direct political participation in the forms of referendums. A certain dynamism can be observed by a number of parliaments opening up with the help of e-petitions including more or less elaborate systems of electronic signature collection.

Whether the further de-materialisation of the vote will continue and lead to an alienation of the voter or is even to be expected by a younger generation entering political maturity is still an open question.

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